

GAO

Report to the Chairman, Committee on
Government Operations, House of
Representatives

March 1990

AD-A219 547

U.S. WEAPONS

The Low-Intensity Threat Is Not Necessarily a Low- Technology Threat



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Program Evaluation and
Methodology Division

B-236947

March 2, 1990

The Honorable John Conyers, Jr.
Chairman, Committee on Government Operations
House of Representatives

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Dear Mr. Chairman:

This report responds to the Chairman's request for information on three questions concerning low-intensity warfare (LIW): (1) What are the LIW threats and contingencies U.S. armed forces face? (2) What are the LIW lessons to be learned from the recent past? (3) How is DOD addressing technology requirements for fighting LIW? This report is an unclassified summary of our work; a more detailed description of our findings can be found in the classified version of this report, which we are delivering concurrently to your office. Appendix 1 contains a summary of our objectives, scope, and methodology.

A brief explanation will suffice to distinguish the term "low-intensity warfare," which is a significant aspect of our focus here, from the more broadly used term "low-intensity conflict" (LIC). Current U.S. LIC policy places primary emphasis on indirect measures—such as economic and military aid, training and advice, and information policy—to address a range of political-military operations focused on instabilities in the Third World. These operations include counterinsurgency, antiterrorism, peacekeeping, peacetime contingency operations, and counter-narcotics activities. In the event that indirect measures fail, the U.S. armed forces can be called upon to become directly engaged in combat in pursuit of the same political-military objectives, as was recently the case in Operation Just Cause in Panama. We were requested to confine our inquiry to low-intensity warfare, which is that subset of low-intensity conflict where U.S. armed forces are directly and substantially engaged in combat in a low-intensity environment. According to the Department of Defense (DOD), LIC and the LIW subset together are a form of conflict highly likely to occur in the future.

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LIW Threats U.S. Armed Forces Face

To identify the LIW threats, we reviewed DOD LIC threat assessments and LIC-related reports from the State Department and the Arms Control and Disarmament Agency, all for the year 1988. These official threat assessments and reports identified a large number of countries where domestic instability, terrorism, insurgencies, regional war, narcotics trafficking,



and other LIC problems are occurring or are likely to occur. These countries are located in every inhabited region of the world and present a broad range of differences along climatic, political, social, economic, cultural, and religious dimensions. The LIC problems that occur can adversely affect U.S. interests, and a wide variety of threats can occur in multiple forms, often simultaneously, in individual countries. Thus, the potential exists in many locations for complex situations to develop in which U.S. interests are in jeopardy, peaceful measures do not succeed, and U.S. armed forces consequently are called into direct action.

From the same official sources, we identified a second, more limited group of countries described as potentially or actively involving themselves in, or materially supporting, even unintentionally, activities that contribute to various LIC problems by virtue of their external relations with others. These countries' activities—carried out by governments, or groups or individuals associated with them—either were characterized by official sources as having negative impacts on certain U.S. interests, or evidence was presented to make that implication clear. While this group was not generally considered in official documents to be the fundamental cause of LIC-related problems throughout the world, their activities were described as contributing to or exacerbating them. Because an identification of these countries and their activities helps to establish the global parameters of the LIC problem, we focused on them particularly. We define them here as countries that have tended to exacerbate external LIC problems.

The DOD threat assessments and State Department reports identified a range of activities associated with these countries, as follows: support for international terrorism occurring in other countries; active involvement in illegal international narcotics-trafficking; promotion of domestic instability in other countries through activities such as subversion, sabotage, assassination, and other hostile intelligence actions; active involvement in insurgencies or civil wars contrary to U.S. interests; participation in regional war or cross-border military operations the United States does not support; Third World possession or possible development of chemical or nuclear weapons; the possession or transfer to others of conventional weapons with adverse regional-security or generally destabilizing effects; and threats to U.S. transit or base rights or the provision of base rights to the Soviet Union.

Those countries and activities that exacerbate external LIC problems are listed in our classified report. The documents we reviewed did not always explicitly describe the activities of many of these countries as

constituting LIC threats to the United States. However, they did describe activities by them as posing specific problems for U.S. interests. The list shows the diverse activities that these countries have undertaken.

In addition to the broad spectrum of potential LIW locations, there is a wide variety of weapons that U.S. armed forces must be prepared to confront. This speaks not only to an expanded, highly diversified threat but one in which the types of weapons likely to be encountered may differ in major ways from country to country. Prominent in this diversity is modern, sophisticated military hardware. In fact, the official documents we reviewed stated that advanced military technology has been distributed throughout the Third World and is easy to acquire. According to these sources, the military-technology gap between the major powers and the Third World is rapidly narrowing. Some exporters from Western countries reportedly have been transferring ever more sophisticated technology in order to compete in the Third World arms market.

The cumulative effect has been arms deliveries to and transfer agreements with the Third World by certain governments totaling \$38.4 billion in value over the 1983-87 period. This dollar amount roughly approximates the combined annual defense budgets of France and the Federal Republic of Germany. These arms sales have included 52 major warships, 242 supersonic combat aircraft, and over 2,300 surface-to-air missiles. Recipients of these weapons have included Libya and Iraq, as well as other countries identified as exacerbating external LIC problems. As a result of some of these arms transfers, recent LIW events have seen U.S. armed forces confronting both modern Soviet weapons (which also commonly appear in the arms inventories of many of the countries that exacerbate LIC) and modern French aircraft and guided missiles (such as Mirage F-1 fighter aircraft, Exocet antiship missiles, and Crotale surface-to-air missiles).

In addition, in LIW in the Persian Gulf, U.S. armed forces were required to prepare for threats from, or actually to engage, U.S.-built systems that had been sold to Iran in the 1970's or more recently. These included Maverick and Harpoon missiles, F-14 and F-4 aircraft, and other U.S. systems (such as TOW and Stinger missiles) that had been provided to Iran directly by the United States or by retransfer from other parties. Clearly, when the United States sold these weapons to Iran in the 1970's, there was no expectation on the part of the United States that these weapons would ultimately be used as they actually were.

An important aspect of the threat posed to U.S. armed forces by the presence of Western weapons in the hands of potential or actual LIW opponents is that such systems often possess operating characteristics different from those of Soviet-designed systems. Generally, while Soviet and Western weapon systems perform similar overall functions, specific examples of Western systems—such as antiship guided missiles—may in fact possess electronic signatures, radar cross-sections, flight profiles, and other operating characteristics different from those of Soviet systems, which can lessen the effectiveness of U.S. detection and countermeasure systems.

While recent experience demonstrates the substantial volume and diversity of international arms transfers, it is entirely possible that future sources of supply might grow even larger and more diverse. For example, if substantial Warsaw Pact forces are demobilized as current trends progress in Europe, a large quantity of surplus, but quite modern, military equipment may become available for transfer to the Third World.

Because potential U.S. LIW opponents possess such a wide array of weapon systems, thereby proliferating the technical challenges U.S. defense equipment may face, we examined the official threat assessments to identify where U.S. armed forces are most likely to be used in combat in a low-intensity environment, or, in the absence of any such explicit statement, where LIC problems are stated to be most severe and important U.S. interests most seriously at risk. We searched the threat assessments for these priorities because DOD described these documents as (1) providing guidance to U.S. armed forces to accomplish their responsibilities to plan and carry out missions; to develop and acquire equipment; to train units; and to formulate strategy, doctrine, and tactics; and as (2) the principal intelligence basis for planning strategy, force structure, budgeting, and contingency planning for short- and medium-term periods.

While there is evidence that DOD has written contingency plans for a multitude of scenarios, in the documents we reviewed we found no evidence that DOD has attempted to identify the ones most likely to occur—except, of course, in those cases where the National Command Authority has ordered that an actual operation take place. We found few meaningful specifics to indicate priorities established in the threat assessments that would assist planners to determine what specific scenarios, tactical situations, and weapons to prepare for. In only a very limited number of cases was a specific location identified in the context of the possible use of U.S. forces in combat, and, in all such cases, the statements of

probability were either vague or indeterminate. In the official documentation available to us, we found little, if any, guidance to help U.S. armed forces determine what specific weapons U.S. forces are most likely to meet and, therefore, what specific technical challenges U.S. defense hardware should address.

Several important points emerge from the foregoing information.

- First, the range of potential situations and locations where U.S. armed forces may be called on to take direct action is global.
- Second, U.S. forces are confronted in potential LIW with an array of weapons that can have substantially different operating characteristics from the Soviet weapons that they have been preparing to face in a major war in Europe.
- Third, the so-called low-intensity threat is not necessarily a low-technology threat. The weapons that U.S. armed forces may encounter in future LIW span the range of military technology that exists throughout the modern world; that is, it is not just poorly equipped opponents we confront.
- Finally, the weapons we face may be our own.

Thus, while there are some similarities, it becomes quite clear that the LIW threat is more than just a lesser version of the high-intensity, Soviet threat. The technology available to the LIW threat goes beyond the Soviet threat at both the high and low ends of the spectrum. The contingencies U.S. armed forces may face also include combinations of weapons from Western, Soviet, and other sources—a factor that can potentially complicate the technical challenges even further.

This makes it all the more important for planning to occur that examines the particular configurations of the weapon systems we are most likely to face in given locations, under different contingencies. Yet, the threat assessments we reviewed did not identify in a meaningful manner either the most probable scenarios or associated opposing weapons from a global range of possibilities. It is therefore unclear how the armed services can determine their most pressing hardware needs for LIW. This is a critical problem, since DOD has determined that this form of conflict is one our military must expect to confront in the future, and since the experience of recent years indicates some serious problems in the use of U.S. hardware.

LIW Lessons From the Recent Past

To examine the LIW experience of the recent past, we reviewed four LIW combat events: the evacuation of U.S. citizens from Grenada in 1983 (Operation Urgent Fury), the Marine Corps peacekeeping mission in Lebanon from 1982 to 1984, the Navy and Air Force air strikes over Libya in 1986 (Operation El Dorado Canyon), and the deployment of naval forces in the Persian Gulf beginning in 1987 (Operation Earnest Will).¹ We further selected four categories of hardware to review within the four LIW events: joint communications equipment, precision-guided munitions, unguided munitions, and helicopters. Our findings concerning this hardware are summarized in appendix II and are discussed below.

Joint Communications Equipment

For joint communications, significant problems were demonstrated in each LIW event. For the Grenada operation, communications hardware was described as outmoded, heavy, unreliable, and maintenance-intensive. Operating procedures were also problematic; common codes and radio frequencies were not always distributed among service units, causing interoperability impediments even when the equipment was physically compatible. The nature of joint communications problems was somewhat different in the other LIW events.

The planning for Grenada was tightly compressed in time, and the operation was short in duration. As DOD discussed in its lessons-learned reports, time constraints and inadequate planning meant that needed alterations were not made to bridge joint communications hardware and procedural gaps. For the three other operations, time before or during the operation was used to make adjustments to compensate for predicted or discovered communications problems that were both significant and directly relevant to the operation. Before the airstrikes against Libya and during the Lebanon and Persian Gulf operations, hardware and procedures were modified and added, as needed, to enable communications that would otherwise have been impaired. These operations demonstrate that sufficient time and planning are necessary to establish efficient joint communications. However, DOD doctrine points out that LIW contingency operations can be expected to be both short notice and short duration. The Grenada experience illustrates that, under these conditions, reliance on case-specific preparatory and compensatory measures for efficient joint communications can lead to problems. In implementing the recommendations of the lessons-learned documents to

¹Operation Just Cause occurred in Panama after we completed our field work. However, as your office requested, we are seeking DOD documents regarding this operation to enable us to assess the effectiveness of U.S. hardware in this most recent occurrence of LIW.

acquire reliable, interoperable joint communications equipment, it will be important to ensure, once the critical performance and other criteria have been achieved, that such equipment is fully deployed to those forces called on for short notice, short duration contingencies.

Precision-Guided Munitions

The LIW events demonstrated a variety of limitations to the effectiveness of certain precision-guided munitions. (For further details, see our classified report.) However, these limitations are not always factored into the analysis of specific engagements.

For example, DOD itself has characterized the failure of ship anti-air defense systems in the Persian Gulf (the Stark and Vincennes incidents) as due to fundamental failures in the Stark crew's leadership and training, and as an "accident" in the case of the Vincennes' shooting down of a civilian airliner. However, the DOD (and other) reports addressing these incidents discussed operating and design characteristics of the associated physical systems as possessing inherent limitations that we believe should be included in the summary explanations of the failures. For example, under various circumstances, radars and certain other warning systems have significant difficulty in distinguishing between hostile, neutral, and friendly targets. These hardware limitations should be included, along with the human errors DOD has identified, in seeking to derive the overall explanation of the failures.

We also found cases where guided munitions were effective. (See appendix II.) And, in some cases, assessments by us were not possible or were tentative. Laser-guided bombs were used in the Persian Gulf and Lebanon, but the data we received from DOD on their employment in those two operations lacked sufficient detail for us to make any assessment of this weapon's effectiveness in the Persian Gulf and anything but a tentative assessment for Lebanon, where only one instance of use was briefly recorded. Similarly, in Libya, guided antiradiation missiles were used, but the documents made available to us provided no data to compute the ratio of weapons launched to targets hit.

Overall, we found various precision-guided munitions to have a poor success ratio and a significant number and diversity of limitations relating to availability, weather restrictions, ease of employment, inherent technical constraints, and other factors.

Unguided Munitions

The instances we reviewed where unguided munitions were used showed these munitions were effective slightly more frequently than not. Guns and unguided rockets from aircraft and helicopters were effective in Grenada (except for two significant cases in which U.S. forces or civilians were attacked), and in the Persian Gulf against small, fast gunboats. In Grenada, antiquated 90-mm recoilless rifles were effective; our assessment of a different unguided munition has been classified. Large-caliber naval gunfire demonstrated a mixed record, at best, in Grenada and Lebanon and, in most instances of its use in the Persian Gulf, could not be assessed because the data provided did not indicate any ratio of hits versus misses.

In Grenada, guns and unguided rockets were used effectively for close air support missions that laser-guided bombs were unable to perform. However, conditions where unguided and precision-guided types of munitions were used sometimes varied considerably. For example, circumstances (such as weather and time of day) and restrictions (such as rules of engagement) were often different. Accordingly, a direct comparison of relative effectiveness would require further data and analysis. Overall, we found unguided munitions, as employed, to be more frequently effective than ineffective; however, some significant problems were also demonstrated.

Helicopters

Helicopters were useful for a variety of functions that other equipment could not readily perform. However, in Grenada they proved to be highly vulnerable, even to unsophisticated gun systems ranging from 23-mm antiaircraft guns to 7.62-mm infantry assault rifles. While limited, information from Lebanon and the Persian Gulf tended to support an assessment of helicopters as versatile yet vulnerable in the presence of light, unsophisticated defenses. Clearly, the vulnerability of helicopters is an important factor when considering how and when to use them, how to design future models, and how much they should cost.

Problems in Facing Unsophisticated Threats

In our earlier discussion of the LIW threat, we addressed certain problems relating to modern sophisticated Western weapons in the hands of LIW opponents. During the course of our lessons-learned review, we identified an additional area of concern: Unsophisticated hardware—some of it Soviet, some of it Western—has presented significant problems to certain current U.S. systems, some of them the newest, most technically advanced equipment available. For example, in the Persian Gulf, small, fast motor boats and slow commercial aircraft were

found to be a threat to major U.S. surface warships. Existing, sophisticated cannon-and-missile ship defense systems were said to have limited utility against these threats, and, as a consequence, machine guns and grenade launchers were added to the armaments of major surface warships. The joint communications problems that were encountered occurred in the absence of electronic jamming by opponents, and it is possible that in a more stressful, jamming environment additional problems could be experienced. In sum, significant performance problems have occurred—not only against modern sophisticated Western weapons but also against unsophisticated systems, from the Soviet Union and elsewhere, and in the absence of a highly stressful environment for the hardware.

Some of the specific problems in the use of U.S. hardware that we identified are not unique to LIW. Joint communications problems can be presumed to exist for U.S. armed forces in high-intensity warfare as well. The limitations of radars in distinguishing friends, foes, and neutrals apply to the use of radar in any form of warfare. Helicopters that experience vulnerability problems against the armed forces of Grenada will surely have equally serious problems against Soviet air defenses. What is important here is (1) the documentation that all of these specific problems have been encountered in LIW against unsophisticated opponents, and (2) the recognition that the more general problem of a wider weaponry threat is unique to LIW—U.S. and Western European weapons do not constitute part of the high-intensity warfare, Soviet threat.

In addressing various problems and limitations regarding hardware, DOD's lessons-learned documents sometimes derived recommendations on the use of such hardware that, if followed, would obviate or lessen the problems encountered. For example, based on the Marines' difficulties in communicating with allied forces in Lebanon, one report recommended that new procedures be planned and rehearsed. In some other cases, the lessons-learned documents pointed out the need to modify or replace the hardware in question to resolve problems identified. For example, a major Army lessons-learned report from the Grenada operation recommended that the Army consider procuring off-the-shelf, up-to-date communications equipment and making it available to the 82nd Airborne Division as soon as possible. Thus, the resolution of the types of hardware problems we identify here might as often be found in changing operating techniques as in actual hardware alterations.

Quality of the Lessons-Learned Documents

Although some relevant details were lacking in some of DOD's lessons-learned reports, we found that they constitute an important and useful body of information. In many cases, problems were openly addressed and assessed in accord with the data presented. These reports can effectively warn military and civilian planners and operators of previous pitfalls and allow them to build on past successes. The production, dissemination, and assimilation throughout the military services and civilian leadership of these lessons-learned reports comprise an essential part of the effort to avoid the repetition of past mistakes, especially if that leadership translates the various report recommendations into the needed actions.

Summary

Overall, we see in the LIW events of the recent past a number of examples in which U.S. defense hardware demonstrated significant limitations and lack of effectiveness. Fully adequate, interoperable joint communications equipment was not on hand unless special measures were taken, and they were not always taken. Various precision-guided munitions demonstrated a poor success ratio and a significant number and diversity of limitations. Unguided munitions were more frequently effective than ineffective, but significant problems did occur. Helicopters, while versatile, demonstrated unacceptable vulnerability against even weak opposition. In addition to the difficulties noted earlier in operating against modern, sophisticated Western weapons in LIW, we found that some problems have also occurred against unsophisticated weapons and in the absence of severe stress on the hardware, even when U.S. forces were using the newest U.S. equipment available. Overall, the variety and significance of the hardware problems encountered in the LIW events we reviewed comprise a range of vulnerabilities that, unless effectively addressed, could seriously impede the success of U.S. military operations in future LIW. Finally, DOD lessons-learned reports constitute a body of information we found to be important in planning and preparing for future contingencies and in identifying potential alternatives to resolve observed hardware problems.

How DOD Is Addressing Technology Requirements for Fighting LIW

To assess how DOD is addressing equipment requirements for LIW, we collected data from each of the military services, both for general purpose forces and special operations forces. The new joint special operations command has developed an Integrated Priority List for its requirements. The same command is currently conducting a joint mission-area analysis to consider, among other things, the assets available to accomplish mission requirements. However, the baseline report for this joint mission area analysis is not scheduled to be completed until the end of fiscal year 1990. With regard to the Integrated Priority List, its prioritization of hardware requirements does not discriminate between special operations force requirements for low-intensity as opposed to high-intensity warfare, and, in fact, the special operations representatives we spoke to do not consider it useful to make such distinctions. General purpose force representatives also did not see the necessity of distinguishing between weapons intended for low- and high-intensity warfare. We were told that, while current hardware requirements are generally driven by the Soviet high-intensity warfare threat, U.S. weapons are nevertheless expected to be effective across the spectrum of conflict.

We did find some isolated exceptions to this generally expressed view. For example, the Army is currently studying its requirements system with the stated intent of giving low-intensity hardware needs an opportunity to be considered. (These Army studies were not completed at the conclusion of our review.) Navy representatives stated that the priority of certain Navy weapons has been adjusted upward because of their applicability to LIW. The Marine Corps has recently completed a Marine Air-Ground Task Force Master Plan that gives emphasis to low-intensity conflict, and Marine Corps representatives stated that their amphibious forces are currently being equipped and trained for warfare across the spectrum of conflict. Air Force representatives stated that they design systems primarily for the Soviet threat and that to design aircraft systems for other threats would be prohibitively expensive. However, the Air Force also identified a small number of individual programs currently being pursued specifically for LIW.

DOD representatives stated that in other areas not included in our work—such as training, doctrine, and force structure—there has been substantial activity. Although those topics were outside the scope of this report, GAO has done work in these subject areas in the past and will continue to do so in the future.

As noted earlier, our analysis of the LIW threat and the lessons-learned documents showed that if our weapons are to be effective against the

equipment available to potential LIW opponents, they need to be designed to operate against sophisticated Western European- and U.S.-designed hardware, not just Soviet hardware. In addition, we found that current U.S. hardware has also encountered problems against unsophisticated weapons and in a less than stressful environment. Further, our analysis showed that the likelihood for encountering these problems is real, not hypothetical. It seems quite clear—and various DOD representatives agreed—that the spectrum of technology in the LIW threat extends beyond that of the Soviet high-intensity warfare threat.

Nevertheless, the Army's ongoing LIC-related requirements studies are not intended to focus on the non-Soviet-supplied or -trained LIW threat, and current Army exercises at major training centers do train against Soviet doctrine and equipment for LIW but not against the U.S.- or Western European-trained and -equipped threat. Navy equipment intended expressly for LIW scenarios is provided not to Navy forces in general but only when a specific need is identified. While some Marine Corps representatives stated that the Marine Corps is fully trained and equipped to fulfill its responsibilities in relation to non-Soviet as well as Soviet-equipped forces across the spectrum of conflict, other Marine Corps representatives have argued, unofficially, that the Marines are not ready to conduct counterrevolutionary operations because of their incomplete understanding of the political and social problems involved. The Air Force designs equipment primarily against the Soviet threat, and not necessarily against technology from other sources. Finally, the priority lists of hardware requirements we reviewed demonstrated some prioritizations that we found consistent with our analysis of the LIW lessons learned, some that were not, and some where the lessons appeared to have been imperfectly learned.

As a result of the military services' various approaches to hardware requirements, U.S. equipment employed in past LIW has not always been appropriate to the threats encountered. Furthermore, and not unrelatedly, U.S. equipment has not been generally or consistently effective. Overall, most of the military services concern themselves primarily with the high-intensity Soviet threat, arguing generally that equipment designed for that threat would normally address the low-intensity threat adequately. Our review did not show this to be necessarily the case, largely because of the proliferation of sources and types of weapons technology U.S. armed forces have had to confront.

Despite the military services' appreciation of the non-Soviet-equipment threat in LIW, we found no indication that such equipment was systematically considered in DOD's current requirements process. However, it is premature at this point to assess whether ongoing DOD studies will ultimately recommend that such considerations be more fully addressed. We believe that reliance on equipment requirements that do not systematically take into account the types of problems encountered in recent LIW—such as that of limited effectiveness against Western weapons with different operating characteristics from Soviet weapons and against certain examples of unsophisticated opposing hardware—increases the risk of continuing U.S. equipment vulnerabilities against an extremely multifaceted threat.

We noted earlier that the LIC threat assessments we reviewed did not indicate which contingencies and configurations of technology U.S. armed forces appear most likely to face among a global range of possibilities. However, it is clear that DOD faces an imposing task in ensuring that its forces are adequately equipped to face the various LIW contingencies. And, without identifying what scenarios and weapons are most likely to be encountered in specific locations, DOD cannot show that its current approach to equipment requirements is adequate, nor can the military services optimally employ their limited resources and funds to develop and acquire the most appropriate equipment for future LIW.

In sum, we found some evidence of DOD initiatives designed to address LIW technology requirements, but these initiatives were either incomplete or lacked a concerted plan or concept to address the full range of demonstrated problems. The lack of comprehensive efforts to address the Western, U.S., and other military technology U.S. armed forces may face in LIW, the ineffectiveness of some U.S. systems against unsophisticated weapons, and the failure to incorporate the other technology lessons learned lead us to believe that the kinds of significant problems encountered in the past could well occur again.

It is also important to keep in mind the fact that the problems we have discussed occurred against generally poorly equipped and/or trained adversaries. Against more competent, highly motivated, better equipped LIW forces, additional and more severe U.S. problems and shortcomings could occur.

Overall Conclusions

Subject to the limitations and constraints identified in this report, our conclusions are as follows:

1. The potential LIW scenarios and weapons that U.S. armed forces face are diverse and pervasive. Prominent in the LIW threat are weapons supplied by some Western countries, including the United States and other major NATO nations, that can possess operating characteristics different from the Soviet weapons that U.S. forces have prepared to face in high-intensity warfare. Low-intensity warfare is not necessarily low-technology warfare, and the weapons the United States faces may be Western European- or U.S.-made.

2. In recent LIW, current U.S. defense hardware has exhibited numerous instances of unsuccessful employment or significant limitations. In the four categories of systems we reviewed

certain unguided munitions were effective; however, some serious problems were also demonstrated;

various precision-guided munitions showed a poor success ratio and a significant number of limitations relating to availability, weather restrictions, ease of employment, inherent technical constraints, and other limitations;

adequate, interoperable joint communications equipment has not always been on hand; and

helicopters, while versatile, have exhibited vulnerability described by some lessons-learned reports as "unacceptable."

3. Serious performance problems have occurred against modern, sophisticated Western weapons, against unsophisticated Soviet and other systems, and in the absence of a highly stressful hardware environment. Against higher quality opposition, additional and more severe U.S. problems and shortcomings can be expected.

We also noted that lessons-learned reports constitute an important body of information that, if properly disseminated and mined, should be useful to both civilian and military leaders and planners for suggesting ways to resolve identified hardware problems. In addition, although our detailed review was limited to LIW hardware issues, it is also the case that DOD has actively undertaken efforts to address other LIW issues such as training, doctrine, and force structure.

We conclude that there are three broad needs that DOD should consider in its efforts to be materially prepared for and credible in low-intensity warfare.

1. Because U.S. weapons have not been systematically designed for the full range of LIW hardware threats that DOD itself expects its armed forces to encounter in the future, more emphasis must be placed on designing U.S. weapons that work against both sophisticated and unsophisticated systems from multiple sources.

2. Careful planning is needed to

- determine the threat configurations most likely to be encountered in LIW in order to identify the specific weapon systems that may be deployed against us in critical locations;
- assess the limitations of our current weapon systems in light of those threats;
- seek to achieve, through various means (such as procurement, training, or changes in operating methods), a more appropriate balance between the most likely threats and our available weapon systems.

3. Finally, in view of budget constraints and, most importantly, the changed international environment as it affects the nature of the Soviet threat and the increased likelihood of U.S. forces being engaged in LIW, there may be a need to review spending on some expensive weapons programs, especially if they are not appropriate, or cannot be rendered cost-effective, in an LIW environment.

Our review was performed in accordance with generally accepted government auditing standards.

At your office's request, we did not seek formal agency comments from the Department of Defense. We did, however, receive informal comments from relevant DOD personnel and made changes where appropriate. As agreed with your office, unless you publicly announce the content of this report earlier, we plan no further distribution of it until 30 days from the date of this report. At that time, copies will be sent to interested congressional committees and to the Secretary of Defense and the Director of the Office of Management and Budget and made available to others upon request.

If you have any questions or would like additional information, please call me at (202) 275-1854 or Dr. Michael J. Wargo, Director of Program Evaluation in Physical Systems Areas, at (202) 275-3092. Other major contributors to this report are listed in appendix III.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Eleanor Chelmsky". The signature is fluid and cursive, with a large, stylized initial "E" and a long, sweeping flourish at the end.

Eleanor Chelmsky
Assistant Comptroller General

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Abbreviations

DOD	Department of Defense
GAO	General Accounting Office
LIC	Low-intensity conflict
LIW	Low-intensity warfare
NATO	North Atlantic Treaty Organization
TOW	Tube-launched optically-tracked wire-command-link-guided antitank missile

Objectives, Scope, and Methodology

In agreement with Chairman Conyers' office, we identified three evaluation questions that are addressed in our report: (1) What are the LIW threats and contingencies U.S. armed forces face? (2) What are the LIW lessons to be learned from the recent past? (3) How is DOD addressing technology requirements for fighting LIW?

Because of the breadth and importance of low-intensity conflict, it is necessary to clarify the scope of this report. We were requested to confine our inquiry to low-intensity warfare, which is that subset of low-intensity conflict where U.S. armed forces are directly and substantially engaged in combat in a low-intensity environment. Further, we were asked to focus on the effectiveness of U.S. defense hardware used in LIW missions in the recent past, and what this may indicate for the future. While our technology focus is quite narrow when seen from the broader context of all that LIC entails, it allowed us to base many of our findings on actual U.S. combat experience (as opposed to forecasts, models, or opinion). It also allowed us to build a strong knowledge base against which to examine other aspects of LIC in our future work.

The methodology we applied was an information synthesis. Our fieldwork for this report was conducted from July 1988 to August 1989. We visited numerous U.S. government and DOD offices, collected relevant documents, and interviewed both government and nongovernment experts. There is a great deal of available information. To identify the sources that were representative of the various points of view and that could give us an accurate picture of government programs and policies, we solicited recommendations from experts both in and outside the government, reviewed many bibliographies for recurring references, collected various data base printouts, and asked experts in the subject matter to review our bibliography.

Our findings are supported primarily by evidence from the White House, DOD, the State Department, and other relevant executive branch agencies. In addition to expert and eyewitness accounts, we also used a number of congressional studies. In some cases, we found the data presented did not support assessments made in the documents; in other cases, the data provided a logical basis for assessments the documents did not make. In such instances, we made our own assessments.

We employed various criteria in our work, especially regarding our assessments of the effectiveness of U.S. weapons in recent LIW. We assessed hardware as effective if DOD data indicated that, as employed, it (1) accomplished the tactical military mission assigned to it, (2) did so

in an efficient manner, and (3) did not result in significant unintended effects. In obtaining information to make these determinations, we asked the following sorts of question: Was the equipment in usable condition? Were extraordinary preparatory measures required? Was the volume of munitions expended to destroy the target excessive? Did the munitions hit and destroy the target? Was the correct target hit, or were friendly forces or civilians attacked by mistake?

In some situations, specific weapons performed effectively, while in other situations the same weapons were ineffective. This occurred both within individual IJW events and across events. Numerous factors can explain this variation in combat performance. For example, human errors, environmental conditions, and circumstances surrounding different combat engagements—such as rules of engagement—are not uniform. In some cases, various types of munitions were used simultaneously against the same target. And, although in such cases the target may have been successfully attacked, assessments of effectiveness were not possible because the available information did not identify such relevant information as how many munitions of a specific type scored hits and the level of damage inflicted by that munition type. Our findings concerning hardware effectiveness relate only to the employment of the hardware in the situations under review. The same equipment that we determined to be effective or ineffective might perform in a different manner in other circumstances. In pointing out gaps in information collected by DOD from combat events, we are not stating that DOD's data collection was at fault; the very nature of combat obviously limits the opportunity to observe events, distinguish variables, and perform all the other data collection techniques that are possible and appropriate under more controlled conditions, such as firing tests.

There are some limitations to our work. We did not review documents classified higher than "secret," nor could we examine certain other documents. Some documents did not always provide sufficient information to permit us to make an assessment of weapon effectiveness or to identify or clarify the specific reasons for the success or failure of hardware. Our hardware analysis is grounded in recent U.S. combat experience; substantial further analysis would be needed to evaluate the extent to which a multitude of ongoing DOD hardware acquisition programs and policies may effectively deal with several of the areas our findings address. Finally, it is important to note that our review of DOD requirements focused on technology, and not on training, doctrine, or force structure.

Successful Employment and Significant Problems Noted in the Use of Selected Hardware in Four Low-Intensity Warfare Events

Hardware	Grenada (Urgent Fury)	Lebanon	Libya (El Dorado Canyon)	Persian Gulf (Earnest Will)
Joint communications equipment	Significant problems ^a	Significant problems	Significant problems	Significant problems
Precision-guided munitions				
Laser-guided bombs ^b	Significant problems	Tentative assessment ^c	Significant problems	Effectiveness unknown ^d
Antiradiation missiles	Not applicable ^e	Not applicable	Effectiveness unknown	Not applicable
[Material deleted]				
TOW ^f	Effective ^g	Not applicable	Not applicable	Tentative assessment
Naval surface-to-surface missiles	Not applicable	Not applicable	Not applicable	Effective
Surface-to-air missiles	Significant problems	Not applicable	Not applicable	Significant problems
Unguided munitions				
Recoilless rifle	Effective	Not applicable	Not applicable	Not applicable
60-mm mortar	Effective	Not applicable	Not applicable	Not applicable
[Material deleted]				
Large-caliber naval gunfire	Significant problems	Effective and significant problems	Not applicable	Effectiveness unknown
Air-delivered				
Bombs	Not applicable	Not applicable	Effective	Effectiveness unknown
Rockets	Effective	Not applicable	Not applicable	Effective
Guns	Effective and significant problems	Not applicable	Not applicable	Effective
Helicopters				
Utility	Effective	Effective	Tentative assessment	Effective
[Material deleted]				

^a"Significant problems" means that, based on our evaluation of DOD documents and/or interviews with DOD officials, the defense hardware was judged to demonstrate significant problems.

^b[Material deleted]

Appendix II
Successful Employment and Significant
Problems Noted in the Use of Selected
Hardware in Four Low-Intensity
Warfare Events

^c"Tentative assessment" means that, based on the available data, there were some indications that the munition was effective, as employed, but that the data presented was not complete; accordingly, we made a tentative assessment only.

^d"Effectiveness unknown" means that the DOD data we received provided insufficient evidence to make any assessment. In some cases, very few instances of use occurred, and they were very briefly recorded; in other cases, there were several instances of employment, but the data presented, while it contained some details, made an assessment of employment impossible.

^e"Not applicable" means that we found no evidence of attempted use in the documents we reviewed.

^fTOW = Tube-launched optically-tracked wire-command-link-guided antitank missile.

^g"Effective" means that, based on our evaluation of DOD documents and/or interviews with DOD officials, the defense hardware was judged to have performed effectively, efficiently, and as intended.

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